

CLAIM(S):

1. A liquid dispensing and recirculating system comprising:
 - a container having a mouth;
 - a cap for coupling with the mouth;
 - a connector for coupling with the cap, the connector further comprising:
 - a connector head; and
 - a probe extending from the connector head and insertable through the cap and into the mouth, the probe having a flow passage therein which terminates near a probe tip;
 - pump means coupled with the probe and with the flow passage for pumping fluid in the container through the probe and the flow passage; and
 - fluid return means formed on the probe for returning recirculated fluid to the fluid in the container such that air in the fluid is released above the fluid in the container to prevent injection of air into the fluid in the container.
2. The liquid dispensing and recirculating system of claim 1, wherein the fluid return means is a fluid channel formed along an exterior of the probe from an area proximate to the connector head to an area proximate to the probe tip.
3. The liquid dispensing and recirculating system of claim 2, wherein the fluid channel has a first depth at the connector head greater than a second depth at about the probe tip, the first depth uniformly transitioning to the second depth along the channel.

4. The liquid dispensing and recirculating system of claim 2, wherein the fluid channel has a uniform depth.

5. The liquid dispensing and recirculating system of claim 2, wherein the fluid channel extends along the probe substantially parallel with the flow passage.

6. The liquid dispensing and recirculating system of claim 1, wherein the fluid return means includes a bore formed at the area proximate to the connector head for delivering the recirculated fluid to the fluid return means.

7. The liquid dispensing and recirculating system of claim 6, wherein the bore is sized such that recirculated fluid remains within the fluid return means as it is returned to the container.

8. The liquid dispensing and recirculating system of claim 1, wherein the cap includes a first key element and the connector includes a second key element configured to mate with the first key element.

9. The liquid dispensing and recirculating system of claim 8, further comprising:

sensor means for sensing when the first and second key elements are mated and for sensing when the first and second key elements are not mated.

10. The liquid dispensing and recirculating system of claim 9, wherein the sensor means comprises a detector mounted on the connector and a detector affecting element mounted on the cap, the detector mounted on the connector

having two states, one state when the first and second key codes are mated and the cap and connector are coupled in a predetermined orientation and a second state when the first and second key codes are not mated and the cap and connector are not coupled in the predetermined orientation.

11. The liquid dispensing and recirculating system of claim 9, wherein the sensor means comprises a detector mounted on the cap and a detector affecting element mounted on the connector, the detector mounted on the cap having two states, one state when the first and second key codes are mated and the cap and connector are coupled in a predetermined orientation and a second state when the first and second key codes are not mated and the cap and connector are not coupled in the predetermined orientation.

12. The liquid dispensing and recirculating system of claim 9, further comprising:

controller means coupled with the sensor means and the pump means such that the controller means enables the pump means when the sensor means senses that the first and second key elements are mated and disables the pump means when the sensor means senses that the first and second key elements are not mated.

13. The liquid dispensing and recirculating system of claim 1, further comprising a pressure assist port that is coupled to an external pressure source for introducing pressurized gas into the container to facilitate flow of the fluid from the container.

14. A probe for dispensing liquid from and returning liquid to a container comprising:

a flow passage extending through the probe from a first end of the probe to a second end of the probe;

a fluid return port; and

a fluid return channel in fluid communication with the fluid return port via a bore, the fluid return channel extending longitudinally along an exterior of the probe substantially parallel to the flow passage from the bore to about the second end of the probe.

15. The probe of claim 14, wherein the fluid return channel has a first depth at the bore greater than a second depth at about the second end of the probe, the first depth uniformly transitioning to the second depth along the fluid return channel.

16. The probe of claim 14, wherein the fluid return channel has a uniform depth.

17. A method of dispensing and recirculating liquids comprising:
providing a container having a mouth which communicates with an interior of the container;
attaching a cap over the mouth;
coupling a connector to the cap, wherein the connector includes a probe defining a fluid passage terminating within the interior of the container at a tip of the probe;
defining a fluid return channel on the probe;
dispensing fluid from the container through the fluid passage; and

refilling fluid into the container through the fluid return channel such that air in the fluid is released above the fluid in the container to prevent injection of air into the fluid in the container.

18. The method of claim 17, wherein the steps of dispensing fluid from the container and refilling fluid into the container are performed simultaneously.

19. The method of claim 17, wherein the step of refilling fluid into the container comprises:

recirculating the dispensed liquid back into the container through the fluid return channel.

20. The method of claim 17, wherein the fluid return channel is formed along an exterior of the probe from an area proximate to the connector head to an area proximate to the tip of the probe.

21. The method of claim 20, wherein the fluid return channel has a first depth at the connector head greater than a second depth at about the tip of the probe, the first depth uniformly transitioning to the second depth along the channel.

22. The method of claim 20, wherein the fluid return channel has a uniform depth.

23. The method of claim 20, wherein the fluid return channel is formed along the probe substantially parallel with the flow passage.

24. The method of claim 17, wherein the fluid return channel includes a bore formed at the area proximate to the connector head for delivering the fluid to the fluid channel.